UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/661,078	09/12/2003	Amar K. Pati	07844-608001 / P561	7096

21876 7590 07/13/2007	EXAMINER
FISH & RICHARDSON P.C. P.O. Box 1022 MINNEAPOLIS, MN 55440-1022	CARTER, AARON W

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

		Application No.	Applicant(s)
		10/661,078	PATI, AMAR K.
Office Action Summary		Examiner	Art Unit
		Aaron W. Carter	2624

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>07 September 2004</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-36</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-6,10-13 and 19-36</u> is/are rejected.

7)☒ Claim(s) <u>7-9 and 14-18</u> is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>12 September 2003</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date <u>9/7/04</u>.

4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application

6)☐ Other: _____ .

DETAILED ACTION

Claim Rejections - 35 USC § 101

1.   35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or
> any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and
> requirements of this title.

The USPTO "Interim Guidelines for Examination of Patent Applications for Patent Subject
Matter Eligibility" (Official Gazette notice of 22 November 2005), Annex IV, reads as
follows:

> Descriptive material can be characterized as either "functional descriptive material" or "nonfunctional descriptive
> material." In this context, "functional descriptive material" consists of data structures and computer programs
> which impart functionality when employed as a computer component. (The definition of "data structure" is "a
> physical or logical relationship among data elements, designed to support specific data manipulation functions."
> The New IEEE Standard Dictionary of Electrical and Electronics Terms 308 (5th ed. 1993).) "Nonfunctional
> descriptive material" includes but is not limited to music, literary works and a compilation or mere arrangement
> of data.

> When functional descriptive material is recorded on some computer-readable medium it becomes structurally and
> functionally interrelated to the medium and will be statutory in most cases since use of technology permits the
> function of the descriptive material to be realized. Compare In re Lowry, 32 F.3d 1579, 1583-84, 32 USPQ2d
> 1031, 1035 (Fed. Cir. 1994) (claim to data structure stored on a computer readable medium that increases
> computer efficiency held statutory) and Warmerdam, 33 F.3d at 1360-61, 31 USPQ2d at 1759 (claim to
> computer having a specific data structure stored in memory held statutory product-by-process claim) with
> Warmerdam, 33 F.3d at 1361, 31 USPQ2d at 1760 (claim to a data structure per se held nonstatutory).

> In contrast, a claimed computer-readable medium encoded with a computer program is a computer element
> which defines structural and functional interrelationships between the computer program and the rest of the
> computer which permit the computer program's functionality to be realized, and is thus statutory. See Lowry, 32
> F.3d at 1583-84, 32 USPQ2d at 1035.

Claims 19-36 are rejected under 35 U.S.C. 101 because the claimed invention is directed

to non-statutory subject matter as follows. Claim 19 defines a "software product, tangibly

embodied in a machine-readable medium" embodying functional descriptive material. However,

the claim does not define a computer-readable medium or memory and is thus non-statutory for

that reason (i.e., "When functional descriptive material is recorded on some computer-readable

medium it becomes structurally and functionally interrelated to the medium and will be statutory

in most cases since use of technology permits the function of the descriptive material to be

realized" – Guidelines Annex IV). The examiner suggests amending the claim to embody the

program on "computer-readable medium" or equivalent in order to make the claim statutory.

Any amendment to the claim should be commensurate with its corresponding disclosure.

Claim Rejections - 35 USC § 102

2.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3.   Claims 1-6, 10-12, 19-24 and 28-30 are rejected under 35 U.S.C. 102(b) as being

anticipated by USPN 5,640,200 to Michael.

As to claim 1, Michael discloses a method for classifying elements of a digital image, the

method comprising:

Receiving an element of the digital image and a prototype representing a class of

elements (column 9, lines 41-46, wherein in the test image corresponds to the element of the

digital image and the golden template corresponds to the prototype representing various

acceptable images which corresponds to a class of elements);

Generating a difference image representing differences between the received element and the prototype and including a plurality of ON pixels, each ON pixel representing a local difference between the received element and the prototype (column 10, lines 8-17, wherein the difference image contains pixels that differ between the test image and golden template and those pixels correspond to the ON pixels), wherein the difference image includes one or more clusters of ON pixels, each cluster including one or more neighboring ON pixels (column 10, lines 28-34, wherein the blobs or plurality of connected pixels corresponds to a cluster of ON pixels);

Determining relative arrangements of ON pixels in the difference image (column 10, lines 21-34, column 15, lines 22-28 and column 16, lines 15-32, wherein the location, area, perimeter orientation and interia correspond to determining relative arrangements of ON pixels);

Assigning one or more scores to the difference image using the determined relative arrangements of ON pixels in the difference image (column 10, lines 21-34, column 15, lines 22-28 and column 16, lines 15-32, wherein based on the relative arrangements of ON pixels in the difference image the pixels are compared to threshold and assigned a value, see also equations 7, 8, 9a and 9b); and

Based on the scores assigned to the difference image, determining whether the received element of the image belongs to the class represented by the prototype (column 10, lines 21-34, column 15, lines 22-28 and column 16, lines 15-32, see also equations 7, 8, 9a and 9b, based on the assigned values for each pixel, or score, the test image is classified as either containing a defect or not and if it is not considered to contain a defect it is classified as belonging to the class represented by the golden template or prototype).

As to claim 2, Michael discloses the method of claim 1, further comprising:

Identifying one or more of the clusters of ON pixels in the difference image (column 10, lines 28-34 and column 16, lines 15-32, wherein the blobs or plurality of connected pixels corresponds to a cluster of ON pixels).

As to claim 3, Michael discloses the method of claim 2, wherein:

Determining relative arrangements of ON pixels in the difference image includes, for each identified cluster, determining a relative arrangement of ON pixels in the cluster, the determined relative arrangements specifying a shape for the cluster (column 10, lines 28-34 and column 16, lines 15-32).

As to claim 4, Michael discloses the method of claim 3, wherein:

Assigning one or more scores to the difference image includes assigning a score to each cluster based on the shape of the cluster (column 10, lines 28-34 and column 16, lines 15-32, see also equations 9a and 9b).

As to claim 5, Michael discloses the method of claim 1, wherein:

Assigning one or more scores to the difference image includes assigning a score to each ON pixel in the difference image (column 10, lines 21-27 and column 15, lines 22-28).

As to claim 6, Michael discloses the method of claim 5, wherein:

Assigning a score to each ON pixel includes assigning a score to each ON pixel based on a number of other ON pixels in a predetermined neighborhood of the ON pixel (column 15, lines 22-28 and column 16, lines 15-32).

As to claim 10, Michael discloses the method of claim 1, wherein:

Generating a difference image includes generating a difference image that includes one or more OFF pixels, each OFF pixel representing lack of local difference between the received element and the prototype (column 10, lines 8-17, wherein the difference image contains pixels that differ between the test image and golden template and those pixels correspond to the ON pixels, while pixels not included in the difference image correspond to OFF pixels).

As to claim 11, Michael discloses the method of claim 1, wherein:

Receiving an element of the digital image includes receiving a bitmap image element including neighboring pixels of the same bit value (column 9, lines 41-46, wherein in the test image corresponds to the element of the digital image).

As to claim 12, Michael discloses the method of claim 11, wherein:

Receiving a prototype includes receiving a bitmap of the prototype (column 9, lines 41-46, wherein the golden template corresponds to the bitmap of the prototype).

As to claims 19-24, please refer to the rejections of claims 1-6 above, respectively.

As to claims 28-30, please refer to the rejections of claims 10-12 above, respectively.

Claim Rejections - 35 USC § 103

4.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

5.   Claims 13 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Michael.

        As to claim 13, Michael discloses the method claim 12, wherein generating a difference

image includes performing a subtraction operation of each pixel of the bitmap image element

with the bitmap of the prototype. However, Michael does not expressly disclose the use of a

Boolean Exclusive-Or operation for generating the difference image. It would have been

obvious to one having ordinary skill in the art at the time the invention was made to generate the

difference image since the examiner takes Official Notice of the equivalence of using a

subtraction operation and an exclusive-or operation for their use in the electrical engineering art

and the selection of any of these known equivalents to generate a difference image would be

within the level of ordinary skill in the art.

        As to claim 31, please refer to the rejection of claim 31 above.

Allowable Subject Matter

6.   Claims 7-9 and 14-18 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

7.   The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

USPN 4,887,304 to Terzian discloses a process of analyzing a difference image.

USPN 5,548,326 to Michael discloses a process of analyzing a difference image.

USPN 5,673,332 to Nishikawa et al. discloses a process of analyzing a difference image.

USPN 5,850,466 to Schott discloses a process of analyzing a difference image.

USPN 5,859,698 to Chau et al. discloses a process of analyzing a difference image.

USPN 6,330,354 to Companion et al. discloses a process of analyzing a difference image.

USPN 6,963,425 to Nair et al. discloses a process of analyzing a difference image.

USPN 7,058,204 to Hildreth et al. discloses a process of analyzing a difference image.

USPN 7,095,878 to Taylor et al. discloses a process of analyzing a difference image.

USPN 7,162,073 to Akgul et al. discloses a process of analyzing a difference image.

8.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Aaron W. Carter whose telephone number is (571) 272-7445. The examiner can normally be reached on 8am - 4:30 am (Mon. - Fri.).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on (571) 272-7453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Aaron Carter
AU 2624